

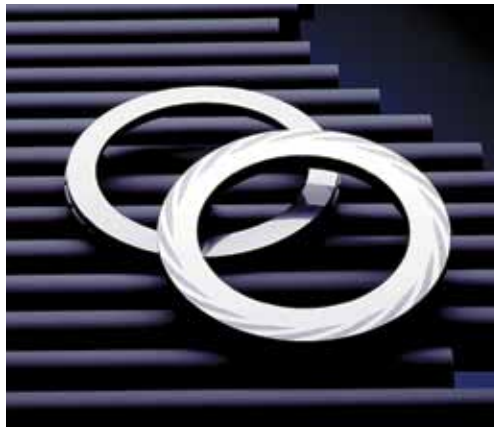


Gas Seals for Compressor Applications

Advanced Technology, Expertise, Local Service, Global Footprint

Proven Experience

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John Crane is part of Smiths Group, a global technology business and is recognized as a global leader in the design, development and manufacture of a wide range of products and services for the world's process and industrial markets.

From its origins more than 90 years ago, John Crane has become a world leader in the design, development and manufacture of an increasingly wide range of products and services for the world's process and industrial markets.

These include oil and gas, refineries, petrochemical/chemical plants, gas transmission pipelines, LNG and ammonia plants. As the gas industry in particular continues to grow relative to other energy sources, John Crane can assist customers in achieving their own growth goals.

John Crane has a legacy of experience gained from its large installed base and expertise in design, production and installation. In addition there is a network of service centers and a commitment to the future through our development programs. These combine to ensure that John Crane can offer our customers the re-assurance of both proven products and after sales support, as well as a committed response to future challenges.

Performance You Can Trust

John Crane has a proven track record with over 40 years of gas seal experience on which to draw and the largest operational fleet of installed gas seals in the world.

Our gas seals have been operating for over 750 million hours.

Our global team offers over 1500 years of combined gas seal knowledge.

We have over 20,000 gas seals installed and running.

We operate three Centers of Excellence across the continents, in the USA, Europe and Japan.

Advanced Technology for Now and the Future



Innovation

We believe our commitment to innovative technology to be unmatched in the seal industry. The spirit of development, which started with the first gas seal spiral groove patent back in 1968, thrives to this day.

A global team of research and development engineers focuses on the latest seal design, material, legislative and application challenges, such as next-generation ultra-high pressure seals for re-injection duties and the emerging requirements of carbon dioxide capture and storage – a climate change initiative in many countries.

In addition, significant investment is directed to the improvement of proprietary analysis tools that assist both our product development and customer service initiatives.

John Crane has an established track record of innovations plus a wealth of experience and practical installations of customer-specific individual applications. This enables us to look forward with confidence to meeting the evolving requirements of our customers. Our commitment to technology is total.

Testing

A fleet of state of the art test rigs across three continents replicate ever more closely actual operating environments.

Continuous investment in equipment has given us the capability to test seals with sizes up to 500mm / 19 $\frac{5}{8}$ " diameter, pressures up to 800 bar / 11,800 psi and speeds up to 60,000 rpm.

Field Applications

Many customers recognize the depth and breadth of knowledge across our global sites and so turn to John Crane to assist with their gas seal challenges. Customer-specific designs, retrofits, and challenging duties at the extremes of the operational envelopes are worked through by our experienced design teams. Close relationships often result from working closely with customers to meet the needs of their seal qualification programs, leading to dedicated long-term collaborative partnerships.

Type 28 Gas Seals

Since the introduction of the first dry gas seals in the 1970s, the John Crane Type 28 gas seal family has evolved to offer the most comprehensive set of products and options suitable for all applications. The products are differentiated by their pressure rating but overall product selection is dependent on a full appreciation of duty conditions, including speeds, temperatures, sizes and chemical compatibility.

Type 28AT

The original gas seal, with a design pedigree stretching back over 30 years and evolving gradually, installed and proven in thousands of compressors all around the world and remaining the preferred seal choice for many customers.

Type 28XP

Possibly the most popular seal in the range today, the Type 28XP builds on the 28AT design and seals medium to high pressures with improved chemical resistance. It can also operate over a wider temperature range and is increasingly the preferred product for large sizes, and for applications requiring slow roll and coast down conditions.

Type 28EXP

The product for the most challenging and hostile environments with proven and independently audited performance to 425 bar.

All three designs are supported by a vast reference list of installed seals.



Separation Seals



John Crane separation seals form part of the total sealing system. They provide the essential protection against migration of bearing oil into the dry gas seal cartridge as well as process gas from entering the bearing.

Type 83

Using more recent contacting technology, the Type 83 has built on the original Type 82 design it replaces. A sequence of enhancements provides the lowest consumption rates for separation gas together with the resilience to cope with a variety of seal environments.



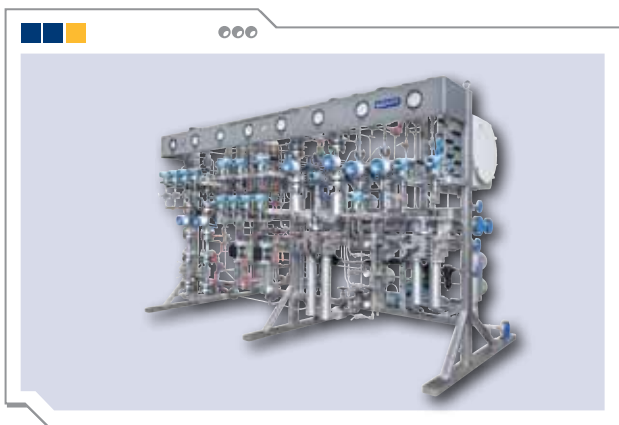
Type 93FR

Using proven non-contacting technology combined with design innovations, the Type 93FR shows leading performance in its category, together with the flexibility to be used with both pressure and flow control of separation gas.

Gas Seal Support Systems



The correct control of separation gas plays a critical role in helping customers achieve optimum and cost effective performance. Whether to reduce running costs, minimize usage of any separation gas in short supply, or to ensure safe running and avoidance of explosive mixtures, we can recommend a solution.



John Crane INOVIT gas seal support systems comprise a range of options for separation gas control, as well as comprehensive primary seal gas and secondary buffer gas support systems to complement the Type 28 gas seal range. Please request a gas seals support systems brochure for more information.

Supporting Your Maintenance and Reliability Strategy

At John Crane, gas seals are “more than just a product”. A gas seal purchase is just the first stage of a total package John Crane offers customers.

Service Centers

With state of the art refurbishment facilities plus dynamic test rigs and using proprietary technology, seals are returned to as-new condition by dedicated service teams. Comprehensive inspection reports are also produced.

Access to original drawings, component details and specifications and local availability of approved spares ensures parts are guaranteed to match those of the original seal. Local service ensures rapid turnaround times, in many cases removing the need for time-consuming export/import administration and delays.

Service Engineers

Our engineers offer a wealth of experience, including on-site seal installation, start-up support and operating reviews, even in the most challenging and difficult environments. They also offer users advice on seal operation and can be available for on-site seal removal and inspection during planned maintenance. Willing to travel to any location, offshore certified, and also available for emergency call out, they offer a fully flexible, comprehensive customer support service.

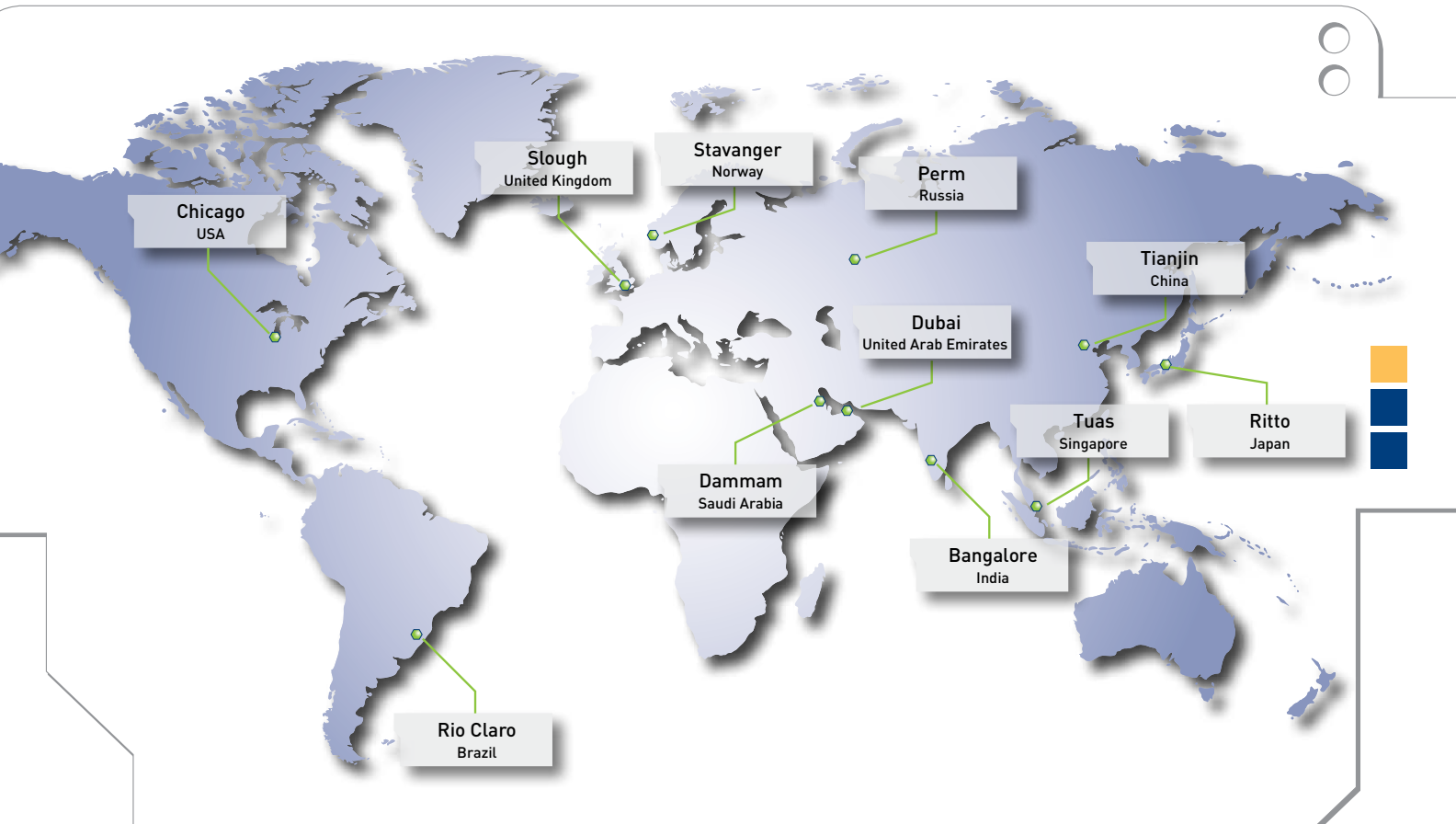


Reliability Team

This team, possibly unique in the industry, helps customers improve the quality-to-cost ratio of their gas sealing equipment. Experienced and dedicated, they provide proactive consultancy, as well as focused expertise to facilitate and drive root cause analysis work. The team can identify and advocate methods of improving site reliability as well as analyzing the most difficult and intractable seal running problems.



Global Gas Seal Service Center Network



Around the World, Around the Corner

Our service centers are unmatched in their capabilities and global coverage, with locations in all the major gas production regions of the world, together with regional centers of excellence. Facilities are constantly upgraded and the network continues to expand.

Current service centers are located in Brazil, China, India, Japan, Norway, Russia, Saudi Arabia, Singapore, United Arab Emirates, United Kingdom and the USA.

Customer Training

John Crane's dedicated customer training team delivers over 50 gas seals courses annually around the world, often using our own dedicated training facilities.

Instructor-led training can be combined with practical experience, mentoring, and e-learning among other options to create packages designed to meet the specific needs of customers.



For your nearest John Crane facility, please contact one of the locations below.

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